

CeNCOOS Progress Report
Period: October 1, 2004 – March 31, 2005
Questions to Stephanie Watson, swatson@mbari.org or 831-775-1987

1.0 Progress on Regional Association Development

1.1. Actions taken to: (actions can include workshops; meetings; committees/councils formed, etc.):

Prepare business and governance plans in accordance with Ocean.US guidelines

The CeNCOOS Governance and Business Plan Committee met on January 19, 2005 and corresponded frequently over email to develop the Memorandum of Agreement (MOA) to initiate CeNCOOS and meet the Governance Certification Criteria for RAs. (The meeting summary can be found at: <http://www.cencoos.org/news.htm>) The CeNCOOS MOA, which was based on the GoMOOS bylaws and the AOOS MOA, has in turn been used as a model by several of the other Regional Associations. The MOA was signed on March 24, 2005 by eleven signatory institutions, with four more planning to sign in the next two weeks. The eleven signatories include academic/research institutions, non-profit organizations (including the San Francisco Marine Exchange, which is a nonprofit, but has many industry partners), one federal agency partner and a for-profit corporation. The initial signatories are:

- UC Santa Cruz
- Moss Landing Marine Labs
- Point Reyes Bird Observatory
- Commonweal
- CODAR Ocean Systems
- NMFS
- San Francisco Marine Exchange
- Desert Research Institute's Western Regional Climate Center
- Stanford University
- Humboldt University
- Monterey Bay Aquarium Research Institute

Other signatories in the next two weeks (already have approval to sign, just need to sign):

- UC Davis
- San Francisco State University
- CSU Monterey Bay
- Ocean Imaging, Inc.

It should be noted that most of our federal agency partners did not sign per a recent email from Marcia Weeks at NOS noting that they shouldn't sign at this point. The state agency partners followed suit and also did not sign. Although this initial list of signatories is primarily academic/research, that should be expected at this point for a number of reasons: 1) these are the institutions already doing ocean observing; 2) we

have not received sufficient federal support (e.g., budget) for many potential signatories to fully participate, as they are still thinking that IOOS may never actually come to pass; and 3) the mixed messages on federal agency participation in the RAs. It should also be noted that the MOA states that the initial Governing Council will be in place for only one year – to allow for new signatories and representation on the Council. To meet the business plan criteria, CeNCOOS has scoped prospective costs with four different potential consultants and has initiated a pre-proposal to the California Coastal and Marine Initiative (CCMI – a Packard Foundation) to help fund the coordinated development of plans for CeNCOOS and SCCOOS. The pre-proposal will be submitted within a week. In addition, CeNCOOS has been developing drafts of sections of the business plan. For example, CeNCOOS has an extensive document of stakeholder needs identified through a general survey of CeNCOOS partners as well as individual stakeholder visits. CeNCOOS has also been developing a document of CeNCOOS partner capabilities in observations, DMAC, modeling, and outreach, as well as listing additional funding opportunities. Further, CeNCOOS has a geodatabase containing information about ongoing ocean observing activities in the region, which will be used to help inform the business plan. The geodatabase includes the following information: activity name, partners, contact person name, contact person telephone, contact person email, web address, purpose, funding source, years funded, site locations, temporal information (e.g., how frequently is the site/area sampled; what time of year), number of IOOS core oceanographic variables addressed, number of IOOS core forcing variables addressed, the actual variables being measured and the data products being developed. The geodatabase will be queryable from a public website, with the following text-based queries:

1. Which programs are in the CeNCOOS region
2. Where is variable x being measured?
3. Which programs measure variable x?
4. Which variables are being measured by which programs?
5. Which variables are being measured by which programs at which site?
6. Which variables are being measured at site x?
7. Who is the contact person and what is that person's contact information for each program?
8. During what season is variable x being measured?
9. On what sample frequency is variable x being measured for program x?
10. Which program(s) measure(s) variable x during season x at site x?
11. How many IOOS core ocean variables are being measured through program x?
12. How many IOOS core non-ocean variables are being measured through program x?
13. What are the funding sources used for observing program x?
14. What is the web address for observing program x?
15. Who are the partners in program x?
16. Which observing programs are ongoing vs. which are historical vs. which are development efforts?
17. What are the products available from program x and how to get them?
18. What are the products available throughout CeNCOOS and how to get them?

In addition, map-based queries will be available from the same website, using an interactive mapping application (e.g., ArcIMS). The Monterey Bay National Marine Sanctuary's Sanctuary Integrated Monitoring Network (SIMoN) is helping to host the database and develop the interactive mapping application. This work is being accomplished so that it can be emulated by the other Regional Associations. A description and workplan for this database-interactive mapping development can be found at http://www.cencoos.org/documents/ArcIMS_workplan_12_22_04.pdf

Identify and engage stakeholders (What stakeholders will be contacted, have they been engaged, and what will they bring to the table)

The CeNCOOS End User Committee met on 3/29 and crafted a scope for developing products for stakeholders, in concert with the CeNCOOS DMAC and Science Committees, based on existing data and the stakeholder needs identified in the document summarizing needs based on individual visits (described above). The End User Committee is developing a PowerPoint of four suggested products that will be presented at the next CeNCOOS DMAC committee for their feedback on what is easily possible vs. what is not. Members of the End User Committee will also help develop a coordinated outreach strategy, based on existing capabilities in the region.

CeNCOOS has also met with the following stakeholder groups since October 1, 2004: October 2004:

- Met with D. Dorfman, The Nature Conservancy, on CeNCOOS – TNC's Marine Initiative coordination (10/13)
- Met with G. Griggs and R. Robison at UCSC on CIMT/UCSC – CeNCOOS coordination (10/13)
- Discussions during CeNCOOS OPeNDAP-LAS workshop (10/21)
- Developed new CeNCOOS powerpoint with example data products from initiatives throughout the region
- Data links to observing activities in the CeNCOOS region sent to Mira Park, CA DFG, for use of ocean observing data in upcoming GIS workshops for resource managers
- Met with Dave Foley and Peter Holleman, Coastwatch, on relationship between CeNCOOS and Coastwatch and future data products.

November 2004

- Presented at the State Lands Commission's Annual Customer meeting at the Shell Oil Clubhouse, Martinez (11/3)
- Presented at the San Francisco Area Committee meeting at the US Coast Guard facility in Alameda (11/4)
- Met with Heather Parker-Hall, NOAA Hazmat Scientific Support Coordinator, US Coast Guard Island, Alameda (11/4)

December 2004

- Met with John Ryan MBARI (12/2) to discuss the Nature Conservancy's Marine Initiative and hyperspectral imagery in the region

- Met with Gerry Wheaton (NOAA Office of Coast Survey), David Reynolds (NWS), Steve Thompson (NOAA Corps), Robison (CIMT), and Smyth (NOAA NOS) (12/13) to discuss shipping and port stakeholder needs, venues for reaching these stakeholders, and products to develop and demonstrate at the National Harbor Safety Committee meeting in April
- Met with Mike Sutton, Monterey Bay Aquarium's new Director of the Center for the Future of the Oceans (12/21)
- Met with Rebecca Ellin (12/28) on CeNCOOS and how to meet stakeholder needs of the three Coastal Zone Management Agencies in California (BCDC, Coastal Conservancy, California Coastal Commission)

January/February 2005

- Presentation to, and discussion with, the Central California Area Committee (1/7) – oil spill prevention and response committee lead by the US Coast Guard for Monterey and Santa Cruz counties
- Met with Larry Espinoza, California Oil Spill Prevention and Response (1/24) on how CeNCOOS can contribute to their mandates and how OSPR can participate in CeNCOOS
- Met with John Ellison, California Resources Agency (2/2) on coordination with CeNCOOS – particularly through CERES metadata catalog and the Agency's proposal to develop an ocean portal
- Met with Greg Shellenbarger and others at USGS Water Resources Division (2/3) on coordination with CeNCOOS. USGS as a data provider (e.g., sediment monitoring in San Francisco Bay) and user.
- Presentation and discussion with State Lands Commission staff (2/3) on coordination with CeNCOOS. SLC primarily a data user, but they have lots of data in hard copy from permit applications that could be useful to archive.

The diverse group of stakeholders in the above listing bring an equally diverse set of needs and contributions to the CeNCOOS table. For example, the Area Committees need accurate real-time information to help respond to oil spills. They bring an avenue to get surface current data integrated into the response procedures directed by the U.S. Coast Guard. Members of the Area Committees are also tied to other organizations that may have funding opportunities for further product development.

Address regional DMAC issues in concert with national implementation of the Ocean.US DMAC Plan

- CeNCOOS Coordinator, Watson, is a co-PI on the NSF- and SURF-supported Marine Metadata Interoperability (MMI) Initiative, an project to start addressing the metadata issues identified in the original DMAC plan. The MMI website is available at <http://www.marinemetadata.org>
- At the suggestion of the CeNCOOS DMAC, CeNCOOS held an OpENDAP-Live Access workshop at MBARI in October, 2004. The workshop was led by Jon Callahan of NOAA PMEL and walked participants through the process of installing and using OpENDAP and Live Access Server – both of which are among the initial recommendations from DMAC for data transport and on-line

browse, respectively. Approximately 30 data managers from the CeNCOOS region, including several individuals from the SCCOOS region, participated in the one day workshop. The workshop summary and presentations are available at <http://www.cencoos.org/news.htm>

- CeNCOOS partners are participating in the working groups to implement the IOOS Interoperability Demonstration II

Establish education and outreach activities

- As noted above in the business plan section, CeNCOOS has developed several documents to identify stakeholders and their needs: a listing of CeNCOOS stakeholders, a database of CeNCOOS stakeholders categorized according to the seven IOOS goals, and a document with needs identified for a subset of the identified stakeholders.
- A PowerPoint presentation with example data products has been developed and given to diverse stakeholder groups
- A one-pager of “success stories”, or descriptions of how existing ocean observing activities are providing useful data and data products, has been developed and distributed as educational pieces.
- CeNCOOS has developed, and is maintaining, a website (www.cencoos.org). The website includes a data portal where users can central access to real time and near-real time data from HF radar, buoys, shore stations, satellites, and tagged animals/fish/turtles/birds. This portal page is being supported by the Monterey Bay National Marine Sanctuary’s SIMoN program. Statistics are run on the website monthly to track most visited pages, when different pages get the most traffic, and which computers are accessing the webpage.
- CeNCOOS partner, MBARI, has a program called Education and Research: Testing Hypotheses (EARTH) and is planning a workshop on using ocean observing data in high school curricula that meet California state standards
- Two focused stakeholder meetings are being planned for Humboldt Bay (with Humboldt Bay Stewards) and San Francisco Bay (with San Francisco Bay NERR and the San Francisco Estuary Institute)
- Sub-regional programs, such as CICORE, CIMT, the Sanctuaries, and the NERR programs continue with their educational activities that include ocean observing and monitoring data

1.1. Results of the activities

Most of the results of these activities are described above. In addition, CeNCOOS has expanded its listing of informal partners from 30 to 55.

1.2 Plans for the next year to make progress on preparing the business plan, engaging stakeholders, addressing DMAC and establishing education and outreach activities

The business plan will be developed with a consultant (one with expertise in nonprofit business plan development and California’s coastal and ocean issues), the support of the CeNCOOS Coordinator, and stakeholder focus groups.

Stakeholders will be further engaged through: focused stakeholder workshops held in different areas of the CeNCOOS region, development of additional data products such as a “state of the region” interactive mapping website, development of a standard public relations package (PowerPoint, brochure, and poster), continued individual stakeholder visits, improvements to the CeNCOOS website, and through the CeNCOOS End User Committee.

DMAC issues will be addressed through the CeNCOOS DMAC committee. This committee will help facilitate data integration between the sub-regional programs and will help participate in the national DMAC effort to identify best practices, protocols, and standards. This committee will also help coordinate closely with state ocean data management efforts and the PaCOOS data management efforts, for example.

2 Priorities for Observations from a Regional Perspective

2.1 Identification of top five priorities for developing the **National Backbone** (observations, DMAC, and modeling) for FY 06-07 and then 08-12, as in last year’s Ocean.US Status and Priorities Report

Observations: FY 06-07. Same priorities as submitted last year for the short-term (i.e., 05-06) with a few changes (below):

Last year’s priorities:

In situ:

- Maintain and enhance the NDBC system in the region (to at least 15 buoys and more instruments per buoy to provide data on wave spectra, T/S chain, CO₂, NO₃, radiometry, fluorescence, backscatter, currents)
- Expansion of the current CALCOFI (and/or PaCOOS) coverage

Remote sensing:

- Maintain existing satellite programs, including backups for key sensors
- Provide continued access to national databases with both archive capability and near real-time support
- Reduce time necessary to provide science data quality products
- Support access to raw data or products so that regional and site-specific algorithms can be developed
- Validate MODIS Terra Oceans products
- Continue to characterize the response of each satellite sensor so that end users can seamlessly use derived products from all sensors without having to make platform-specific adjustments
- Continue development of, and support for, standard data formats (e.g. netCDF) and general public license software (e.g. SeaDAS, CoastWatch Format software)
- Improve atmospheric correction schemes for passive sensors
- Assist and enhance High Frequency radar operations (i.e., a national effort at siting instruments and determining FCC radio frequency allocation).

Changes from previous year with reasons for changes

- Coordinate with ORION
- Maintain and enhance NDBC buoys (in # and more measurements) and coordinate them as a system with DART (tsunami) moorings and other long-term real-time observing activities in the region. Reason for change: Need to coordinate the NDBC effort with the DART effort and other long-term real-time observing activities in the region. Some of the NDBC improvements needed will occur in FY05.
- Expand CalCOFI/PaCOOS coverage (and other biological monitoring) – particularly nearshore coverage (e.g. lines 67, 70 and Humboldt). Reason for change: Need to more fully support nearshore monitoring of biological and oceanographic parameters, which is of greatest interest to many stakeholders
- Federal support other existing programs: a) Expand NWLON coverage and enable as many sites as possible to report every 6 minutes; b) fully support the San Francisco PORTS program; c) support the USGS stream gauges; d) support monitoring in the NERRS and the Sanctuaries. Reason for change: NWLON, SF PORTS, USGS, NERRS and Sanctuaries were not specified last year
- Full federal support of remote sensing (HF radar and satellites) – including interpretation and validation (ground truthing). Reason for change: Did not specify the need for interpretation and ground truthing last year.

DMAC: FY 06-07. Same priorities as submitted last year for the short-term (i.e., 05-06) with a few changes (below):

Last year's priorities:

- Provide metadata guidance, particularly on semantic metadata, to IOOS participants and identify or develop metadata development and catalog submission tools
- Identify data model standards and common data handling protocols
- Demonstrate data products that include gridded and non-gridded data from the national backbone and improve aggregation services for gridded data
- Develop mature data management and communications tools
- Develop a standardized framework for different levels of quality control standards and protocols

Changes from previous year with reasons for changes:

- Instead of “demonstrate data products...”, support interoperability demonstrations that accommodate different levels of data exploration. Reason for change: emphasize the need for interoperability and to accommodate different levels of users
- Coordinate with ORION data management activities
- Develop a CeNCOOS liability and disclaimer statement

Modeling, Analysis and Applications: FY 06-07. These priorities were not requested by Ocean.US last year.

- Higher resolution output from atmospheric models
- Regional scale operational ocean circulation model (including support for forecasting)
- Circulation/sediment transport model (2D) and models to fill in gaps in biological data
- Assessment of NOAA oil spill response model and make enhancements to improve it
- Data products for end users from existing models (e.g., FEMA's storm surge models, GODAE)

Observations: FY 08-12: Same priorities as submitted last year for the long-term (i.e., 07-11) with a few changes (below):

Last year's priorities

In situ:

- Increase the number of buoys and types of measurements collected by buoys in the coastal domain and explore lower-cost systems
- Provide infrastructure for sufficient bandwidth for remote telemetry of data from coastal buoys, gliders, drifters, and other platforms
- Increase the number of drifters, floats, and gliders continually deployed in the coastal domain
- Maintain and expand coastal monitoring stations, which include temperature, salinity, tidal height, etc.
- Maintain ship surveys for hydrographic and fisheries purposes

Remote sensing:

We expect that the FY 07-11 priorities for remote sensing will be similar to the FY 04-06 expectations above, given the long lead time for satellite development efforts.

- Ensure long term support, with no data gaps, for satellite altimetry, SST, ocean color, and scatterometry, with science data quality validation and long term archival of data
- Support the development of a Special Events Imager capability for coastal oceans, such as targetable, hyperspectral (350 nm - NIR or SWIR) ocean color sensor. This would provide temporal coverage adequate for capturing physical processes such as tidal forcing, and would improve retrievals in cloudy or foggy regions. Spatial resolution should be at least 250 m. Simultaneously, increase the frequency and spatial resolution for ocean color, sea surface temperature, winds, and altimetry, at a minimum
- Provide automated, near real time access to remote sensing products via subscription or an internet accessible system. Develop national clearinghouses for wide distribution of datasets such as SAR, which are currently expensive and difficult to acquire.

- Capitalize upon the State of California's investment in High Frequency (HF) radar and associated technologies provide funding through the regional associations for the operation and maintenance of the California Coastal Ocean Currents Monitoring Program, as part of the national HF effort
- Develop remote sensing capability for sea surface salinity

Changes from last year and reasons for these changes:

- "Increase the number of buoys and types of measurements collected by buoys in the coastal domain and explore lower-cost systems." And, coordinate these efforts with the RAs and PaCOOS. Reason for the change: Need to ensure these enhancements are done in coordination with the RAs and PaCOOS.
- Instead of "capitalize upon the state of California's...", Make the National Surface Current Mapping Initiative fully operational. Reason for the change: need to fully support the National Surface Current Mapping Initiative and the regional components for operations
- Coordinate with ORION. Reason for change: Not included last year.
- "Develop remote sensing capability for sea surface salinity" and add a geostationary ocean color sensor. Reason for change: need for the addition of a geostationary ocean color sensor
- "Maintain ship surveys for hydrographic and fisheries purposes", especially in the nearshore, and expand biological sampling to include top predators. Reason for change: need to emphasize the nearshore and expanded sampling to the upper trophic levels.
- "Maintain and expand coastal monitoring stations, which include temperature, salinity, tidal height, etc." and other water quality parameters in the nearshore. Reason for change: need to emphasize the nearshore and add additional water quality parameters

DMAC: FY 08-12. Same priorities as submitted last year for the long-term (i.e., 07-11) with a few changes (below):

Last year's priorities:

- Ensure sufficient bandwidth for data communications (and computing power for atmospheric and oceanic simulations or modeling)
- Operate and distribute the results from high-resolution atmospheric mesoscale models
- Provide guidance on inter-regional coordination for data management and communications
- Define who on the national level is responsible for handling and providing: a) data in real-time/near-real time; and b) more scientific quality data (QA/QCd)
- Demonstrate enhanced data products using gridded and non-gridded data from the national backbone

Changes and reasons for these changes:

- “Demonstrate enhanced data products...” using uniform portals. Reason for change: need to have a common interface that stakeholders can use and recognize as part of IOOS
- “Provide guidance on inter-regional coordination...” and support capacity building on the regional level. Reason for change: need for resources to support building DMAC capacity on the regional levels
- Coordinate with ORION. Reason for change: not included last year

Modeling, Analysis and Applications: FY 08-12. These priorities were not requested by Ocean.US last year.

- Develop sediment transport model for end users
- High resolution oil spill models that are user-friendly
- Operational data assimilation and quality control
- Operational ecosystem model

2.2 Identification of top five **Regional priorities** for observations, DMAC, modeling, stakeholder engagement, and include pilots and research for FY 06-07 and then FY 08-12

Observations 06-07: Same priorities as submitted last year for the short-term (i.e., 05-06) with a few changes (below):

Last year's priorities:

Maintain existing observing efforts

- high resolution surface current mapping
- nearshore monitoring of water quality, high resolution benthic characterization, and high resolution shoreline imagery
- in situ sampling to identify the spatial and temporal variability of coastal ecosystems
- models that provide essential atmospheric forcing data

Enhance in situ data collection

- data from additional buoys, gliders, drifters, AUVs, Unmanned aerial vehicles
- collect more subsurface current data
- collect environmental data associated with unique underwater features (e.g., canyons)
- collect additional water quality monitoring data and integrate water quality monitoring data as appropriate
- collect data to understand the sediment budget in bays and estuaries in the region
- collect additional meteorological measurements

Enhance remote sensing capabilities

- Recognize the need and importance of regional remote sensing expertise. This should include explicit financial support for remote sensing activities (including calibration/validation and product development) at the level of the regional associations.

- Support targeted, high resolution remote sensing in support of regional activities. This would most likely involve access to regional or national airborne platforms (with associated calibration and data processing), but could also be extended to a common pool of in situ equipment such as radiometric sensors.
- Develop high spatial and temporal resolution data sets for coastal monitoring (i.e. the Special Events Imager).
- Improve integration and data merging capability among open ocean sensors, such as satellite altimetry, and comparable coastal systems, such as HF Radar. Many satellite sensors perform poorly or not at all in the coastal ocean (e.g. SSM/I, TOPEX/Poseidon), necessitating a seamless merger between the open ocean and coastal platforms
- Develop and make available climatological and gridded products for applications such as modeling, at appropriate temporal resolution. This would include development of standardized methods for data assimilation and optimal interpolation of coastal data sets, at a minimum of 1 km resolution.

Changes and reasons for these changes:

- “data from additional buoys, gliders, drifters, AUVs, Unmanned aerial vehicles”, with optical and other sensors on some existing assets. Reason for change: need to add sensors to existing assets (e.g., buoys)
- “collect additional water quality monitoring data and integrate water quality monitoring data as appropriate” to provide a land-sea interface understanding and make the data available real-time. Reason for change: need the data available in real-time and need to connect the coastal watersheds to coastal waters
- “collect more subsurface current data” and integrate with surface current measurements. Reason for change: need to integrate subsurface and surface currents together to help develop better 3D circulation models
- Maintain and enhance biological sampling (increase PaCOOS transects into the north, enhance the sampling to include top predators, increase nearshore coverage, invasive species, HABs). Reason for change: not included last year
- Support hyperspectral imagery collection, interpretation, and validation. Reason for change: not included last year

DMAC FY 06-07: Same priorities as submitted last year for the short-term (i.e., 05-06) with a few changes (below):

Last year’s priorities:

Improve data management and modeling (needs to be coordinated through national guidance)

- establish a data and modeling center with a full-time data manager
- Integrate meteorological and oceanographic measurements
- collect and manage socio-economic data related to CeNCOOS products and services

Changes from last year and reasons for changes:

Reason for additions of the below – were not included last year--

- Participate in the IOOS interoperability demonstrations; participate in Marine Metadata Interoperability (MMI) Initiative demonstrations
- Develop good metadata and submit to a web-accessible metadata catalog
- test-bed data integration
- inclusion of State of California data and data management efforts
- Send time series data to NDBC
- make data available via internet accessible services

Modeling, Analysis, and Applications FY 06-07: These priorities were not requested by Ocean.US last year.

- Update and validate existing models
- enlist an operational ocean modeler for the region
- Progress toward a San Francisco Bay operational 3D circulation model
- Oceanographic climatology (analysis of oceanographic conditions showing seasonal trends and variations)

Stakeholder engagement: FY 06-07

- priorities for engagement are industry and resource managers
- need full national support for engagement of stakeholders
- development of a coordinated outreach strategy incorporating all existing, relevant outreach capacities in the region
- goal is for focused end user workshops to be held in the four sub-regions: North coast, San Francisco Bay, Monterey Bay, and Morro Bay/San Luis Bay
- potentially expand completed CeNCOOS stakeholder survey (although the utility of these are limited due to their essentially general nature)
- provide an informational link to stakeholders on ocean monitoring
- participate (provide outreach) in a variety of venues throughout the CeNCOOS region to keep stakeholders informed
- Lecture Series on Ocean Observing Systems
- Develop a CeNCOOS exhibit

Products: FY 06-07

- “State of the region” website to provide access to existing real-time data (may be sectioned into subregions)
- CDIP wave model products further north in the CeNCOOS region
- Products to facilitate central coast Marine Life Protection Act project (identifying, monitoring, and evaluating a network of MPAs) – bathymetry and benthic habitat classifications, ecosystem level studies, nearshore currents
- Surface current products to help understand transport and fate of pollutants, sedimentation, search and rescue, navigation, invasive species (to help inform alternate zones for ballast water exchange) etc. May be high resolution in particularly dynamic areas

- Searchable database/catalog of historical time-series – temperature, winds, currents etc. with ability to push a button and provide user-friendly charts/graphs
- Collaborative effort integrating other observations into NWS models (e.g., vessels, other buoys)
- Uniform presentation of all products is needed – “CeNCOOS brand” and part of IOOS

Pilot projects: FY 06-07

- Data products developed (examples above) using existing data integrated from different sources in the region
- Education and outreach pilot, coordinating and capitalizing upon existing education and outreach expertise in the region

Research: FY 06-07

- most research efforts to further ocean observing should be undertaken at the national level

Observations: FY 08-12. Same priorities as submitted last year for the long-term (i.e., 07-11) with a few changes (below):

Last year's priorities:

Maintain existing observing efforts

- high resolution surface current mapping
- nearshore monitoring of water quality, high resolution benthic characterization, and high resolution shoreline imagery
- in situ sampling to identify the spatial and temporal variability of coastal ecosystems
- models that provide essential atmospheric forcing data

Enhance in situ data collection

- data from additional buoys, gliders, drifters, AUVs, Unmanned aerial vehicles
- collect more subsurface current data
- collect environmental data associated with unique underwater features (e.g., canyons)
- collect additional water quality monitoring data and integrate water quality monitoring data as appropriate
- collect data to understand the sediment budget in bays and estuaries in the region
- collect additional meteorological measurements

Enhance remote sensing capabilities

- Recognize the need and importance of regional remote sensing expertise. This should include explicit financial support for remote sensing activities (including calibration/validation and product development) at the level of the regional associations.
- Support targeted, high resolution remote sensing in support of regional activities. This would most likely involve access to regional or national airborne platforms

(with associated calibration and data processing), but could also be extended to a common pool of in situ equipment such as radiometric sensors.

- Develop high spatial and temporal resolution data sets for coastal monitoring (i.e. the Special Events Imager).
- Improve integration and data merging capability among open ocean sensors, such as satellite altimetry, and comparable coastal systems, such as HF Radar. Many satellite sensors perform poorly or not at all in the coastal ocean (e.g. SSM/I, TOPEX/Poseidon), necessitating a seamless merger between the open ocean and coastal platforms
- Develop and make available climatological and gridded products for applications such as modeling, at appropriate temporal resolution. This would include development of standardized methods for data assimilation and optimal interpolation of coastal data sets, at a minimum of 1 km resolution.

Changes from last year and reasons for the changes

- “high resolution surface current mapping “ , including stabilized operations and integrating surface currents with other current measurements. Reason for change: Need support of operations and maintenance for the state-bond funded Coastal Ocean Currents Monitoring program and the need to integrated HF radar currents with other current measurements.
- “nearshore monitoring of water quality, high resolution benthic characterization, and high resolution shoreline imagery” and tie nearshore bathymetry to topography. Reason for change: need to tie the bathymetry to the topography to adequately model land influences on the coastal ocean, as well as coastal impacts (e.g., El Nino/coastal flooding and erosion).
- Long term, comprehensive and expanded ecosystem health and biodiversity monitoring. Reason for change: not included last year
- Long term coupled observations in coastal watersheds and the coastal ocean, particularly for meteorological and water quality observations. Reason for change: not included last year

DMAC: FY 08-12. Same priorities as submitted last year for the long-term (i.e.,07-11) with a few changes (below):

Priorities submitted last year:

Improve data management and modeling (needs to be coordinated through national guidance)

- establish a data and modeling center with a full-time data manager
- Integrate meteorological and oceanographic measurements
- collect and manage socio-economic data related to CeNCOOS products and services

Changes from last year and reasons for changes:

- “establish a data and modeling center with a full-time data manager”, including sufficient resources for product development. Reason for change: need to have resources for product development linked to the CeNCOOS DMAC efforts
- continue development of good metadata and submission to a web accessible metadata catalog. Reason for change: metadata not specified last year for the long-term and is a critical component of DMAC activities
- Continue development of archive capacity. Reason for change: archive capacity not specified last year
- Data management and access must be transparent to the user and should be coordinated with PaCOOS and other RAs.

Modeling, Analysis and Applications: FY 08-12. These priorities were not requested by Ocean.US last year.

- Coupling of regional and national scale models
- Model surface particle (e.g., pollutants) transport in real time and in 3D
- Sediment transport modeling in real time
- Predictive model assessing land use decisions on nearshore and coastal wetlands, biology
- Scalable models integrating environmental and biological information (e.g., MPA design and evaluation)

Stakeholder engagement: FY 08-12

- need full national support for engagement of stakeholders
- implementation of a coordinated outreach strategy incorporating all existing, relevant outreach capacities in the region
- continue focused end user workshops to be held in the four sub-regions: North coast, San Francisco Bay, Monterey Bay, and Morro Bay/San Luis Bay
- work with educators and school boards to design effective ocean curriculum or school programs
- Develop K-12 school curriculum on ocean monitoring or ocean health
- Design interactive cd on the oceanic processes and species of the CeNCOOS region, directed at high school, college, and general public
- Create and maintain a reliable mechanism for educating public on ocean monitoring broadcasted through the media (TV, radio, and newspaper)
- Maintain posters or exhibits in CeNCOOS partner institutions and public outreach/education facilities (ie. Monterey Bay Aquarium, Seymour Center...)

Products: FY 08-12

- Forecasts of currents, waves, meteorology, beach closures.
- Sediment budgets for selected bays and estuaries
- Tailored products to help with common types of permit applications for coastal development
- Products identifying hot spots of biodiversity – native and non-native

- Biological data integrated with environmental data/ Ecosystem mapping of megafauna tied to potential forcing factors
- Integrated habitat mapping and bathymetric data product (for region)
- Integration of new, upcoming satellite products (salinity, precipitation)
- Tsunami risk map, in coordination with the National Tsunami Hazard Mitigation Program
- Whale distribution in GIS

Pilot projects: FY 08-12

- Data products developed (examples above) using existing data integrated from different sources in the region

Research: FY 08-12

- most research efforts to further ocean observing should be undertaken at the national level

3 Issues, Challenges, and Opportunities

This should include lessons learned, issues that may need to be resolved among regions or at the national level, regional and local funding opportunities, processes not working, etc.

Issues that need to be resolved:

- Clear federal participation in RAs/RCOOSs that does not send mixed messages to other stakeholders
- Coordination with State of California activities (California Ocean Protection Council, MLPA project on the central coast, COCMP program) – The State is not yet fully participating in the RAs/RCOOSs
- Insufficient funding
- Liability (which may be addressed through pending legislation)

Challenges:

- Lack of leadership on the federal government level, with the exception of a few entities, such as NOAA Coastal Services Center. For example, the fact that participation in regional associations by federal agency representatives was not worked out long before this sends very mixed messages to potential stakeholders; this is also the main reason that the initial CeNCOOS Governing Council will not be more representative at this early stage.
- Lack of a coordinated national message on ocean observing that is clearly, consistently, and strongly delivered from all NOPP agencies (and all their sub-parts), as well as regional associations/ocean observing systems.
- Time lag for operational funding is severely hampering our efforts to engage stakeholders
- Insufficient funding necessary for true coordination – this is resulting in extreme pressure on volunteers, who are losing enthusiasm and time for the cause, and is sending mixed messages to stakeholders

- Engagement of industry until we can address their three primary concerns: protection of their proprietary data, protection against liability, and protection of their right to develop value-added products at a cost without the RAs or the government partners providing those products for free.

Regional and local funding opportunities (examples):

- California Ocean Protection Act trust fund
- Local foundations supporting oceanographic research e.g., Sloane, California Coastal and Marine Institute, Part of the Resources Law Group, Resources Legacy Foundation (a Packard Foundation project in Sacramento), Moore
- Regional Water Boards (fines, mitigation, nonpoint source fees) - Gain legal authority to get portion of permit fees, mitigation, fines; provide water quality monitoring
- Grants from the state Office of Oil Spill Prevention and Response
- National Marine Sanctuary and National Estuary Project Funding (focus on water quality)
- CALFED RFP
- UC Marine Council
- Sea Grant research grants
- California Boating and Waterways funding
- Bond funding through propositions 40 and 50

4.0. Recommendations for Conferences and Workshops (issues that should be addressed, desired outcomes or deliverables, etc.). Please try to tie these recommendations to the issues, challenges and opportunities identified in 3.0

Annual implementation conference

Share with federal agency representatives (including OMB) our regional priorities and hear from them on concrete ways they can help us meet those priorities in a coordinated and consistent manner

NFRA meetings

Coordinate educational/public relations activities

Share lessons learned, projects between RAs so that we are borrowing freely from one another

Develop “how to” kits for the RAs. For example, “how to engage coastal managers and meet their needs”, “how to engage industry”, “efficient ways to organize governance”, “how to develop and easily update your business plan”, “how to develop an effective public relations capacity”

Workshops, including regional industry, DMAC, or identification of others needed

Metadata workshop in coordination with the Marine Metadata Interoperability Initiative
Other DMAC workshops in each region, but in coordination with the national DMAC, to help get each region’s DMAC get up and running in a coordinated manner

West Coast industry workshop

CSO stakeholder needs workshop in the region

Outreach coordination workshops (regionally and nationally) – to best coordinate existing, relevant outreach activities

Modeling workshop to coordinate modeling activities nationwide

- 4 Recommendations of Additional Resource Needs (not necessarily money for the RAs, but such as: a) support of the NFRA; b) guidance on data issues that are relevant prior to the point where DMAC picks up; c) guidance on modeling; d) more focused studies on the economic benefits of ocean observing; e) a funded national IOOS education effort, for example...) Again, tie these recommendations to the issues, challenges and opportunities identified in 3.0.

This listing of examples above actually came from CeNCOOS comments on the reporting requirements, so they will be reiterated here:

- Full support of the NFRA
- Full, coordinated support of IOOS
- Full, coordinated support of DMAC across all NOPP agencies and sufficient support for regional participation in DMAC
- Guidance on relevant data issues prior to the point where DMAC picks up (e.g., telemetry, smart sensors)
- Guidance on coordinating and enhancing modeling activities – maximizing our modeling resources will be very important because we do not have the observations on the spatial and temporal scales necessary for many of the needed stakeholder products
- More focused studies on the economic benefits of ocean observing – e.g., a continuation of the coordinated study of the regional benefits of ocean observing (with caveats, such as the need to frame the study according to the 7 IOOS goals; the need to provide more accurate numbers for improvements to sectors, such as ports and marine transportation; and the need for any economic analyses to provide actual numbers that we can directly use – not providing many individual numbers that are categorized without consideration of possible use and have to be aggregated manually)
- A funded national IOOS education effort that builds on the plethora of national ocean education programs
- A coordinated national research effort for furthering ocean observing